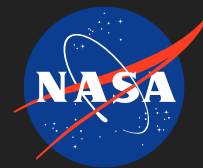


A Miniaturized UV/VIS/IR Hyperspectral Radiometer for Autonomous Airborne and Underwater Imaging Spectroscopy of Coastal and Oceanic Environments, Phase II

Completed Technology Project (2011 - 2014)



Project Introduction

The AquaScan, a miniaturized UV/VIS/NIR hyperspectral imager will be built for deployment on a UAV or small manned aircraft for ocean coastal remote sensing applications. The hyperspectral system includes a data acquisition system with remote operation capability proving a real-time waterfall display of the hyperspectral scans. OKSI teamed with Scripps Institution of Oceanography to define and design a sensor that explicitly meets the performance requirements needed for ocean remote sensing of coastal regions, but can also be used for terrestrial remote sensing. Specifically, some key requirements called for: 1) high spatial resolution (< 1 meter), 2) high spectral resolution (< 10 nm), UV \leftrightarrow NIR coverage (300 \leftrightarrow 1000 nm), 4) high sensitivity for low reflectivity of ocean surfaces, 5) provide simultaneous downwelling solar radiation measurements, and 6) allow for operating mode that avoids specular reflections off ocean surface. The AquaScan design was completed during the Phase I effort. During Phase II the sensor will be manufactured, tested, calibrated, and prepared for flight testing. The system will then be demonstrated during several airborne tests off the Southern California coast. The tests will include measurements of spatially/spectrally unique ocean phenomena including red tide blooms and river plume run-offs after heavy rain storms. Coordinated ship-based remote sensing and in situ measurements will take place concurrently with the newly developed miniature UV/VIS/NIR airborne measurements. The ship-based measurements will serve as ground truth for validation/verification. In addition, OKSI will attempt to coordinate data collections with satellite passes (e.g., MODIS, MERIS, SeaWiFS). Comparison with satellite data will serve as validation and demonstration of the capability to support future satellite programs (e.g., GEO-CAPE).



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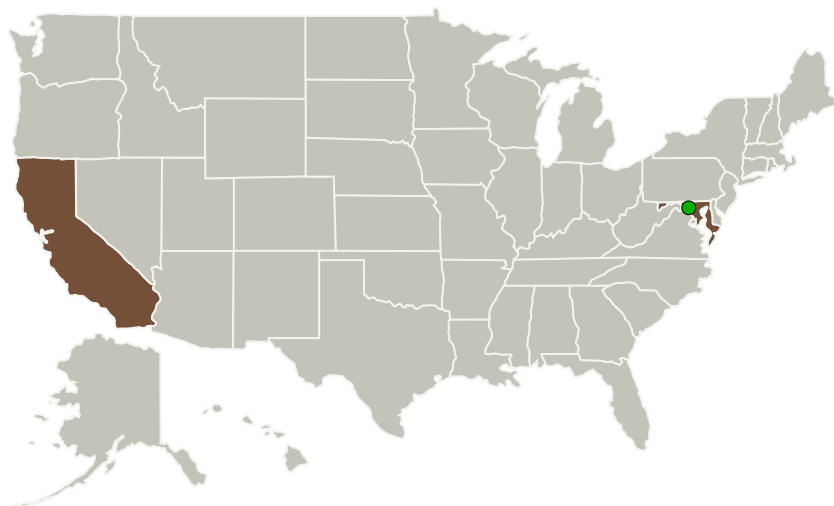
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Primary U.S. Work Locations and Key Partners



| Organizations Performing Work | Role | Type | Location |
|-------------------------------------|-------------------------|-------------|----------------------|
| Opto-Knowledge Systems, Inc.(OKSI) | Lead Organization | Industry | Torrance, California |
| ● Goddard Space Flight Center(GSFC) | Supporting Organization | NASA Center | Greenbelt, Maryland |

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Opto-Knowledge Systems, Inc. (OKSI)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Nahum Gat

Primary U.S. Work Locations

| | |
|------------|----------|
| California | Maryland |
|------------|----------|

Project Transitions

▶ **June 2011:** Project Start

✓ **September 2014:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138623>)

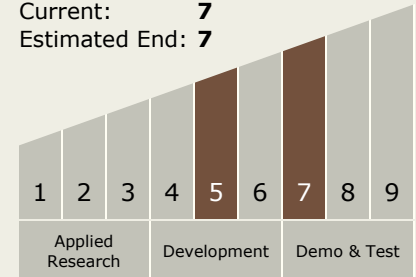
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Technology Maturity (TRL)

Start: **5**
Current: **7**
Estimated End: **7**



Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.4 Microwave, Millimeter-, and Submillimeter-Waves

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System